

# SIEMENS

## MOBILETT Plus HP

**SP**

Service

### Repair Instruction

Replacement of the inverter

Kit part No. 65 53 981

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**66 53 930**

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## Document revision level

The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

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	Page
<b>1 Prerequisites</b>	<b>1 - 1</b>
General . . . . .	1 - 1
Training of customer support engineers . . . . .	1 - 1
Document required . . . . .	1 - 1
Components included . . . . .	1 - 1
Tools required . . . . .	1 - 1
Time required . . . . .	1 - 1
Safety information . . . . .	1 - 2
<b>2 Replacing the Inverter</b>	<b>2 - 1</b>
Preparatory work . . . . .	2 - 1
Replace battery boxes. . . . .	2 - 1
Replace battery shelves. . . . .	2 - 3
Install the capacitor unit, M11, and replace inverter and PROMs . . . . .	2 - 4
Final procedures. . . . .	2 - 5
<b>3 Supplement to Functional Description</b>	<b>3 - 1</b>
Exposure preparation . . . . .	3 - 1
Rotating anode starter. . . . .	3 - 1
<b>4 Supplement to Maintenance Instructions</b>	<b>4 - 1</b>
Maintenance test . . . . .	4 - 1
<b>5 Supplement to Service Instructions</b>	<b>5 - 1</b>
List of test programs available in service mode . . . . .	5 - 1
P02 - Rotation test. . . . .	5 - 1
<b>6 Supplement to Wiring Diagram</b>	<b>6 - 1</b>
Anode rotation. . . . .	150
<b>7 Appendix</b>	<b>7 - 1</b>
P08 . . . . .	7 - 1
P16 . . . . .	7 - 1
<b>8 Changes to previous version</b>	<b>8 - 1</b>

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## General

These instructions describe how to replace the inverter with part no. 65 08 654 on the MOBILETT Plus HP.

The inverter D13 with part no. 65 08 654 is no longer available. It has been replaced by 65 28 306. When replacing the old type with the new one, the existing software has to be replaced by V0.8H (part no. 65 86 114).

It is also necessary to equip the MOBILETT Plus HP with two extra capacitors. To make room for the capacitors, the battery boxes and battery shelves must be replaced too.

## Training of customer support engineers

Due to the technology used in this equipment, setup, service and maintenance should be performed only by customer support engineers who have work authorization for MOBILETT Plus.

## Document required

Service Instructions for MOBILETT Plus HP.

## Components included

The kit (part no. 65 53 981) contains the following parts:

Article	Quantity	Part no.
Software kit: V0.8H	1	65 86 114
Inverter	1	65 28 306
Capacitor unit: M11	1	65 53 767
Battery box	4	65 53 700
Upper battery shelf	1	65 53 692
Lower battery shelf	1	65 53 684
Cable tie	15	65 01 712
Screw	2	62 29 178
Label	1	65 53 676
Repair Instruction (this instruction)	1	66 53 930

## Tools required

Standard tool kit.

## Time required

Replacement of inverter, belonging software, battery boxes and battery shelves, and installation of capacitor unit: approximately 2 1/2 hours for 1 person.

## Safety information

Read all safety notes in the document Service Instructions and pay special attention to the notes below.

**⚠ WARNING**

**Never work with the system open if the batteries are still connected and the capacitor is charged. If the batteries are connected, the complete system is powered on!**

**The capacitors in M10 may still be charged even if the system is switched OFF and the line voltage cable is disconnected. Life-threatening electric shock hazard exists.**

**The capacitors in M10 must be considered charged until the protective measures listed in the document Service Instructions have been performed.**

**CAUTION**

**Be sure to follow the ESD guidelines.**

## Preparatory work

1. Mains voltage OFF.
2. Discharge the capacitor bank. The procedure is described in the document Service Instructions.
3. Mains voltage ON.
4. Set position 1 on switch S1, found on board D1, in position ON (service mode).
5. Run the service programs P08 (Display the message history), and P16 (Show the exposure counter). The procedure is described in the document Service Instructions. The information in these programs will be lost after the exchange of PROMs is done. Write down the information in the attached tables in chapter "Appendix" on Page 7 - 1 and file it under register 10 in the Technical Manual.
6. Mains voltage OFF.
7. Attach the new warning label over the old warning label located behind the back cover.

## Replace battery boxes

1. Unplug all KBATT plugs (1/Fig. 1).
2. Remove the screws (2/Fig. 1) and pull out the four battery boxes.



Fig. 1

3. Open the holding belts (1/Fig. 2) and open the battery boxes by loosen three screws (2/Fig. 2).

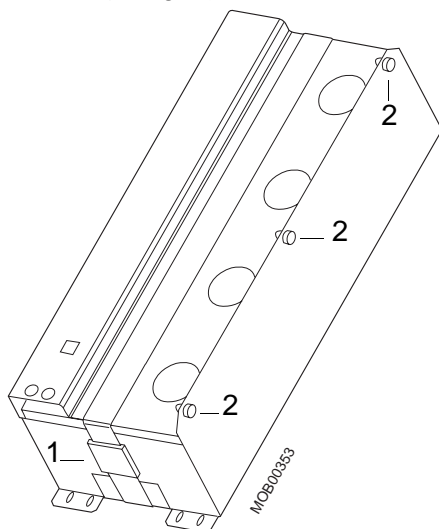


Fig. 2

- 4.



**Do not loosen the jumpers (1/Fig. 3) between the batteries.  
Very high energy is stored in the batteries.  
Life-threatening electric shock hazard exists.**

Replace the old battery boxes.  
Fasten the old top covers and tighten the holding belts.

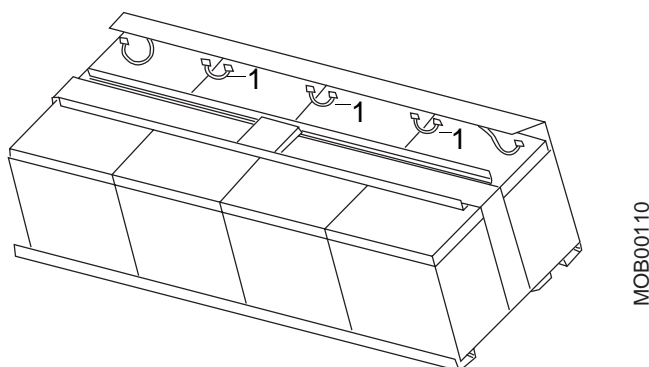


Fig. 3



## Replace battery shelves

1. Pull out the power conversion unit, see chapter with same name in the document Service Instructions.

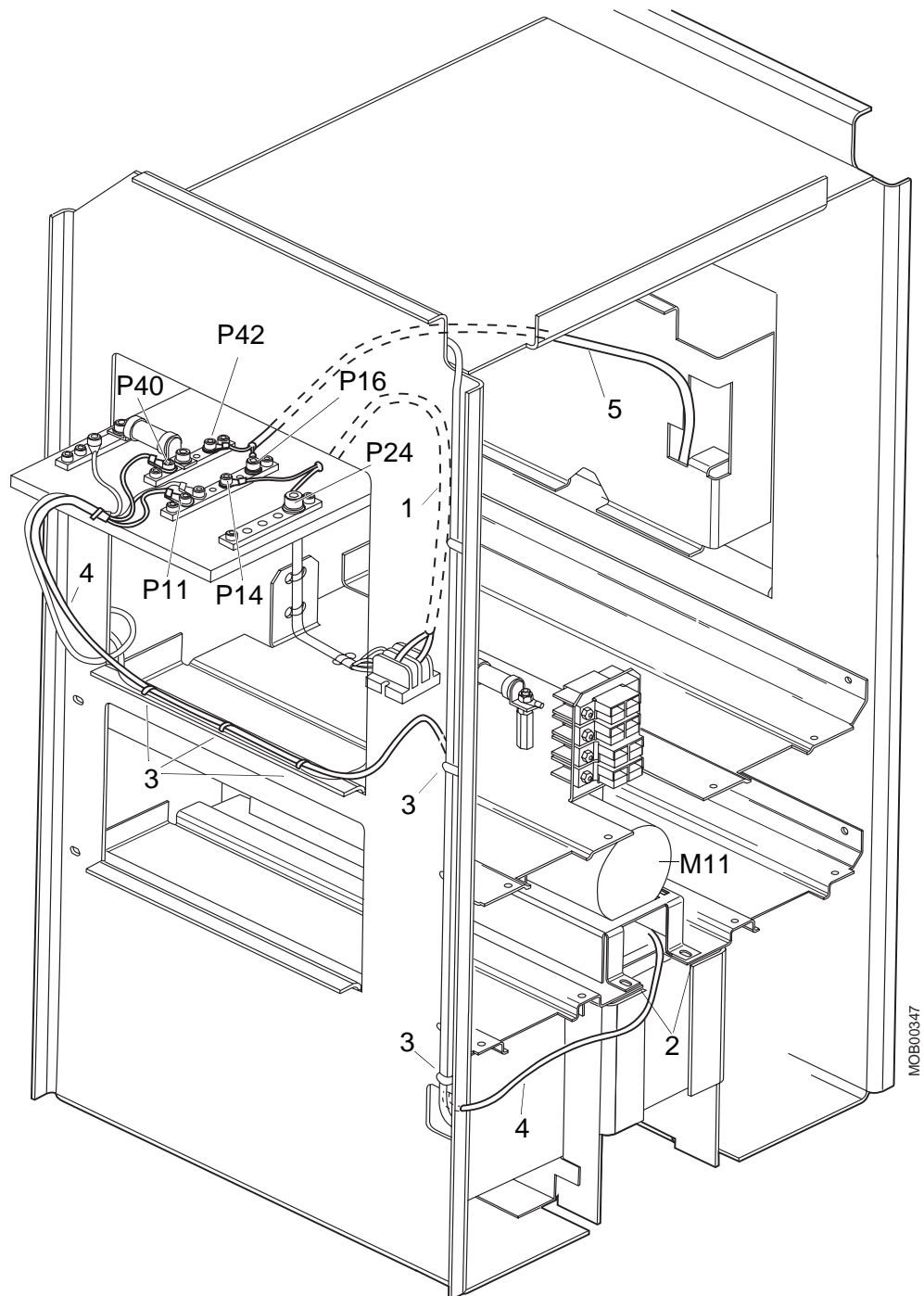


Fig. 4

2. Disconnect cable (1/Fig. 4) from P24 and P14 on the power conversion unit.

3. Cut the cable ties on the upper shelf (1/Fig. 5). Disconnect black cables (2/Fig. 5) and red cables (3/Fig. 5) from the connector (4/Fig. 5).

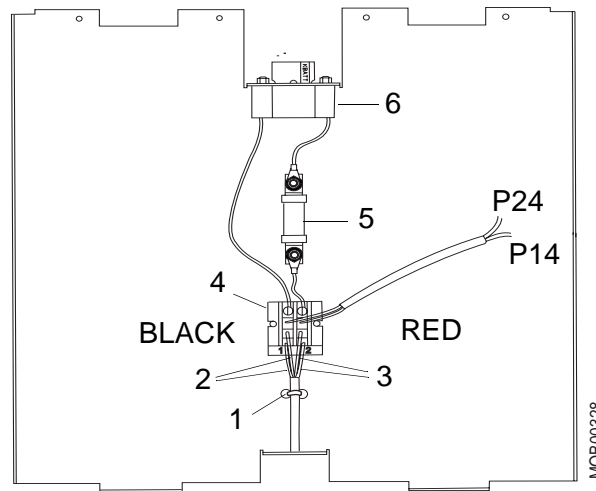


Fig. 5

4. Remove the upper and lower battery shelves from the MOBILETT Plus HP by loosen four screws on each side.
5. Move the fuse (5/Fig. 5), connector (4/Fig. 5) and battery connector (KBATT) (6/Fig. 5) from the old upper battery shelf to the new upper shelf.
6. Insert the new battery shelves and fasten them tight with screws. The heads of the screws must be on the inside of the chassis.
7. Connect cable (1/Fig. 4) to P14 and P24 on the power conversion unit.
- 8.

**WARNING**

**Be sure to connect the red and black cables right (see Fig. 5) otherwise the power conversion unit could be damaged.**

Connect the black (2/Fig. 5) and red cables (3/Fig. 5) to the connector on the upper battery shelf and fasten with new cable ties.

9. Insert the battery boxes, fasten them with screws and connect the battery plugs to KBATT.

## Install the capacitor unit, M11, and replace inverter and PROMs

1. Insert the capacitor unit, M11, and fasten it with screws (2/Fig. 4).
2. Cut cable ties (3/Fig. 4). Connect the cable (4/Fig. 4) to P11 and P40 according to Fig. 4. Fasten with new cable ties.
3. Disconnect cables K8 and K64 on the right-hand side and replace the inverter. Connect cable (5/Fig. 4) to P16 and P42 on the power conversion unit.
4. The PROMs in position I72, I66 and I74 are found on board D1 under the top cover. Replace each PROM with a new PROM marked with the same letters.

## Final procedures

1. Mains voltage ON.
2. Set position 1 on switch S1, found on board D1, in position ON (service mode).
3. Check that the display shows Ver 0.8 H.
4. Run the adaptation program P10. The procedure is described in the document Service Instructions. The program is done when PASS is shown on the display, approximately 20 minutes.
5. Set position 1 on S1 in position OFF.
6. Mains voltage OFF.
7. Remount the top, front and side covers.
8. Check the function by making one exposure.
9. In the chapters "Operation" (sub chapter "Exposure release switch") and "Display messages" (sub chapter "USE xx: Important message") in the **Instructions for Use**, check the maximum preparation time. If it is 10 seconds change it to 20 seconds, sign and write the date on the side. Inform the customer of the change if applicable.
10. Insert the supplements for each technical document attached in this document into the Technical Manual for the Mobilett Plus product affected.



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## Exposure preparation



The primary contact in the exposure-release switch is first closed. This initiates the following functions:

1. switches off the preheating,
2. switches on the exposure heating,
3. starts the two second rotating-anode acceleration,
4. if the anode frequency after acceleration is  $>147$  Hz, the buzzer on board D3
5. generates three beep tones, and
6. the green "ready" LED on the control panel is turned on.

## Rotating anode starter

To get the rotating anode up to speed a control signal with a frequency of 160 Hz is applied to the two test points "ROT A" and "ROT B" on board D4.

The run-up-time requires two seconds. After this the control signal is switched off and the anode runs freely. If the anode loses speed and a frequency  $<147$  Hz is measured, the anode is accelerated for 0,75 s. These additional "pushes" are repeated, if necessary, until the limit of the preparation time (20 s) or until the release of an exposure. A push is interrupted if an exposure signal is made.

The anode is up to speed if the pulse frequency "ROT" is  $> 147$  Hz after the run-up-time of 2 s.

If the frequency detected is below 147 Hz the entire run-up procedure will be repeated and the reached speed will be measured again.

If the second try indicates that the required speed of 147 Hz is now exceeded, the control system generates the internal message "anode up to speed"! This completes the preparation together with exposure heating on.

The green "ready" LED on the control-panel turns on and the buzzer generates three beep tones.

The magnetization in the stator and rotor winding produces an eddy current field which slows down the speed of the rotor. The brake time to a full stop takes 9 s.

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The service program P05 is removed. This affects the maintenance test as shown below:

## Maintenance test

Use these service programs to check the display, filament heating, rotating anode and capacitors.

While the test is running, observe the display. If an error is determined during the course of the test, the program is interrupted and the associated error is displayed, accompanied by an audible signal.

Additional information about each test is located in the section "List of test programs in Service Mode" in the service instructions. The test sequences are also described in this section.

- Start the programs by activating the "Light localizer lamp."

### **PMF Display test**

### **PMF Filament test**

### **PMF Rotating anode test**

### **PMF Capacitor bank and charge test**

**P04** Display test. Check whether the display and the LED's light up and whether the buzzer sounds. The test will automatically be repeated once.

**P01** Filament test. When the test is successfully completed, the following message will appear for 4 seconds:

**FIL PASS** = The filament test was successfully completed.

**P02** Rotating anode test. During this test, rotating anode start-up is checked and the rotation frequency is displayed. The following message appears when the test is successfully completed:

**rot PASS** = The rotating anode test was successfully completed.

**P03** Capacitor bank and charge test. During the test, the actual voltage in the capacitor bank is displayed. The following message appears when the test is successfully completed:

**CAP PASS** = The capacitor bank and charge test was successfully completed.

If an error is determined during any of the tests, the current program stops and the following message appears:

**Err xx** = Test results are "not valid."

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- Max preparation time is increased from 10 s to 20 s.
- The service programs P05 (Automatic maintenance test), P12 (Inverter and single tank test) and P13 (Inverter test) are removed.
- **Only for MOBILETT Plus HP** - The service program P11 (Backup battery test) is removed.

## List of test programs available in service mode

### P02 - Rotation test

(Wiring diagram X037E, page 150)

Accelerates the anode with a 160 Hz control signal during two seconds. After this first acceleration, the speed is measured and if necessary, a second acceleration of two seconds is performed. When the correct speed is reached, the anode will rotate freely for 20 seconds or until the rotation frequency is below 142 Hz before it is braked during 9 seconds to a stop. An error message will be displayed after two unsuccessful attempts to accelerate the anode or if the anode loses speed too fast. When the test is activated, the display shows:

kV mAs

**Rot tEst** = Rotation test

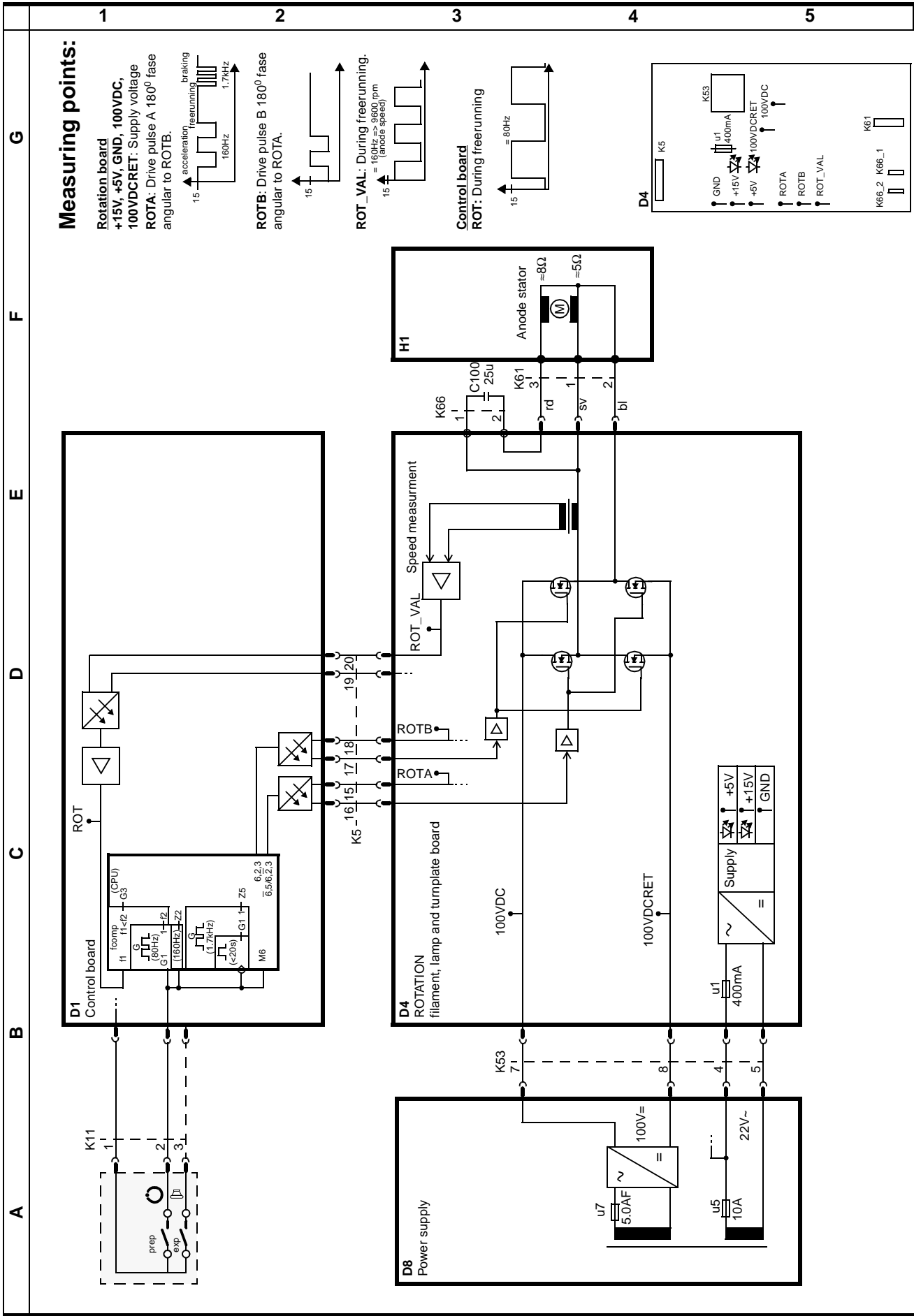
After acceleration, the display shows the actual rotation frequency:

kV mAs

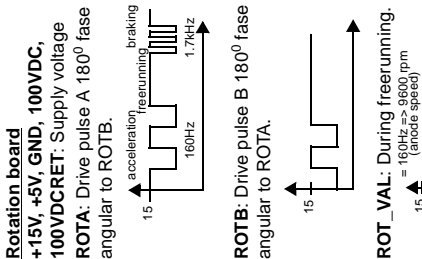
**Rot 143** = Rotation frequency 143 Hz: Normal value 158 Hz. Min. value 142 Hz.

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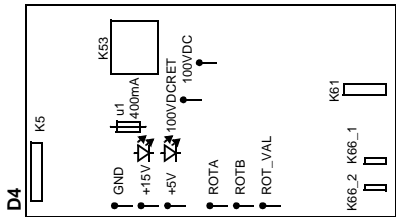
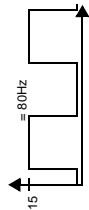
Anode rotation



Measuring points:



Control board  
ROT: During freerunning



X037E

	1	2	3	4	5
G					
F					
E					
D					
C					
B					
A					

P08

Appearance number	Message history

P16

Total amount of exposures.....

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Chapter	Page	Change
0	All	Chapter completely revised.
1	1	New software version with new article number implemented. Article number of this document is changed.
2	5	New step 3.

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